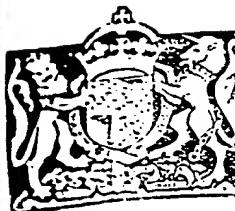


# PATENT SPECIFICATION



Application Date: March 10, 1936. No. 7242/36.

471,865

Complete Specification Left: Jan. 27, 1937.

Complete Specification Accepted: Sept. 10, 1937.

## PROVISIONAL SPECIFICATION

### Improvements in and relating to Portable Compressed Air Driven Turbo-electric Mine Lamps

We, WILLIAM MATRICE, of Park Grange, Sheffield, a British Subject, and THE WOLF SAFETY LAMP (HIRING) COMPANY LIMITED, of Saxon Road Works, 5 Sheffield, S, a British Company, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in portable self-contained compressed air lamps wherein a turbine operated by compressed air drives an alternating current electric generator and lights a lamp which is usually connected directly with the generator.

15 Hitherto, in such apparatus it has been usual for the air to be delivered through a jet or nozzle direct to the turbine blades, thence through the body of the turbo-generator to the inside of a 20 protecting glass surrounding the bulb, onward through a safety device controlled by the air pressure and designed to cut off electric current from the bulb in the event of the protecting 25 glass being broken, and then out into free air through pin hole exhaust orifices surrounding the outer sides of the well glass.

The object of the present invention is 30 to provide greater protection against the risk of a firedamp ignition from a cracked or broken cover glass and electric lamp bulb, and at the same time to simplify the construction of such 35 lamps.

Accordingly the invention consists in a compressed air turbo-alternator lamp of the class described in which the compressed air is admitted to the protecting 40 glass enclosing the electric lamp bulb before it arrives at the jet or nozzle which drives the turbine, in such a way that with any leakage the air pressure falls below that necessary to drive the generator. 45 while a curtain of compressed air continues to issue around the bulb or glow lamp.

By this reversal of the normal direction of air admission to such lamps it is 50 ensured that any air leakage resulting from a cracked or broken glass will result in a fall of air pressure below the point at which the generator can produce sufficient

current to make the filament glow. From the glass cover the air passes through a hole in the insulated plate, which carries the electric lamp bulb and fittings, direct through an appropriate duct to the jet or nozzle from which it impinges on the turbine blades and so drives the current generator. The air then passes through the turbine blades into the body of the machine and exhausts as before through a circle of pin hole orifices into the outer air in such a way as to form a curtain of exhaust air all around the protecting or cover glass.

In our construction, the air passes through the usual combined filter and regulator, which remains where it was in the earlier constructions, but by alterations in the casting which forms the casing for the turbo-alternator the air is thence conducted through a tunnel or duct direct to a hollow ring within the circle 75 of which the electric lamp bulb is carried by a lampholder of usual construction.

On the underside of this hollow ring there is a circle of small holes, through which the supply from the compressed air 80 mains enters the protecting or cover glass.

Having filled the cover glass the air passes through ducts in the casing to the jet or nozzle, drives the turbine, escapes through the spaces in the body of the generator and exhausts as before through a ring of pin holes in the casing to form another wall of continuously moving air 85 around the outside of the cover glass.

By re-arranging the air circuit in this way an entirely reliable safety device is obtained without the use of contact arrangements dependent on the air pressure.

The turbine cannot generate current until there is sufficient pressure within the cover glass to drive it at the required speed. If the cover glass is broken the compressed air escapes through the afore-100 mentioned ring surrounding the bulb into the free air and the turbine ceases to run.

But since it is delivered through pin holes surrounding the electric bulb there continues to be a wall of compressed air 105 escaping from the mains which makes it

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impossible for firedamp to gain access to the filament even if the bulb itself is broken, and the filament is glowing in nominal exposure to the air of the mine.

5 Compressed air will continue to escape round the bulb at full pressure until such time as the supply is cut off at the mains.

Dated the 7th day of March, 1936.

GEE & CO.,  
Patent Agents,  
Staple House, 51 and 52, Chancery Lane,  
London, W.C.2,  
Agents for the Applicants.

### COMPLETE SPECIFICATION

#### Improvements in and relating to Portable Compressed Air Driven Turbo-electric Mine Lamps

We, WILLIAM MAURICE, of Park Grange, Sheffield, a British Subject, and  
10 THE WOLF SAFETY LAMP (HIRING) COMPANY LIMITED, of Saxon Road Works, Sheffield, S, a British Company, do hereby declare the nature of this invention and in what manner the same is to be  
15 performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in portable self-contained compressed air  
20 lamps wherein a turbine operated by compressed air drives an alternating current electric generator and lights a lamp which is usually connected directly with the generator.

25 In British Patent Specification No. 10312 of 1909 it was proposed to introduce air through a single orifice outside the body of the lamp into a protecting glass surrounding an electric lamp bulb  
30 and allow it to emerge therefrom to drive an electric generator, but this arrangement as a safety device is not entirely successful because, if the outer protecting glass is broken, the air is directed downwards in a single stream so that the filament is not cooled or screened from access of firedamp as is essential if danger of an explosion of mine gases is to be avoided.

35 The chief object of the present invention is to provide a lamp structure free of the known disadvantages.

Accordingly, the invention consists in a compressed air turbo-alternator lamp of  
45 the type described in which the compressed air is admitted through an orifice in the lower housing or body of the lamp to a plurality of substantially equally spaced orifices adjacent to and surrounding the electric lamp bulb within a protecting glass, whereafter it is conveyed to  
50 a jet or a nozzle to drive the turbine.

In this way the air issues as a curtain around and directed towards the bulb and  
55 cools the filament and prevents firedamp reaching it even should the momentum of the motor-generator cause it to continue to generate current.

According to a further feature of the invention, the exhaust air issues as a curtain around the protective glass as an additional measure of safety.

In order that the invention may be clearly understood and readily carried into effect, a practical embodiment of the lamp is hereinafter more fully described with reference to the accompanying drawing, given by way of example only, which shows a vertical section through the lamp.

Compressed air is conveyed through a suitable flexible conduit to the chamber *a* in the casting *b* constituting the lamp body. From this chamber *a* extends a radial passage *c* connected with a tubular device *d* which terminates in a hollow ring *d'* which encompasses the electric lamp bulb *e* carried by the usual lamp holder *f* mounted on the insulated plate *g*. The air escapes from the device *d'* through a plurality of substantially equally spaced holes *h* into the space within the protecting or cover glass *i*. From here the air passes through a hole *g'* in the insulated plate *g* to a duct *j* in the casting *b* and thence to the jet or nozzle *k* from which it impinges on the turbine blades *l* and so drives the current generator *m*. The air after passing through the turbine blades *l* exhausts through a circle of pin hole orifices *n* into the outer air in such a way as to form a curtain of exhaust air all around the protecting or cover glass *i*. The path followed by the air is indicated by a number of arrows.

In our construction, the air passes in known manner through the usual combined filter and regulator (not shown), and the cover glass *i* is protected by a wire guard *o*.

The turbine cannot generate current until there is sufficient pressure within the cover glass to drive it at the required speed. If the cover glass is broken the compressed air escapes through the aforementioned ring *d'* surrounding the bulb *e* into the free air and the turbine ceases to run.

But since it is delivered through pin-holes *h* surrounding the electric bulb

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there continues to be a wall of compressed air escaping from the mains which makes it impossible for firedamp to gain access to the filament even if the bulb itself is broken, and the filament is glowing in nominal exposure to the air of the mine.

Compressed air will continue to escape round the bulb at full pressure until such time as the supply is cut off at the mains.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim

is:—

1. A compressed air turbo-alternator lamp of the type described in which the compressed air is admitted through an orifice in the lower housing or body of the lamp to a plurality of substantially equally spaced orifices adjacent to and surrounding the electric lamp bulb within a protecting glass, whereafter it is conveyed to a jet or a nozzle to drive the turbine.

2. A compressed air turbo-electric lamp as in Claim 1 in which the compressed air is conveyed to a hollow ring, encompassing the lamp bulb, from which it

escapes through pin holes directing the air onto and around the bulb.

3. A compressed air turbo-electric lamp as in Claim 1 or Claim 2, in which the compressed air subsequently passes through an aperture in an insulated plate carrying the lamp holder and is conveyed through a channel or channels, within the metal constituting the lower housing, to the jet or nozzle.

4. A compressed air turbo-electric lamp as in any of the preceding Claims, in which the compressed air, after passing through the turbine blades, escapes into the outer air through a plurality of substantially equally spaced pin holes, extending around outside the cover glass, directing the air downwardly as a curtain around the outer glass.

5. A compressed air turbo-electric lamp substantially as hereinbefore described and as illustrated in the accompanying drawings.

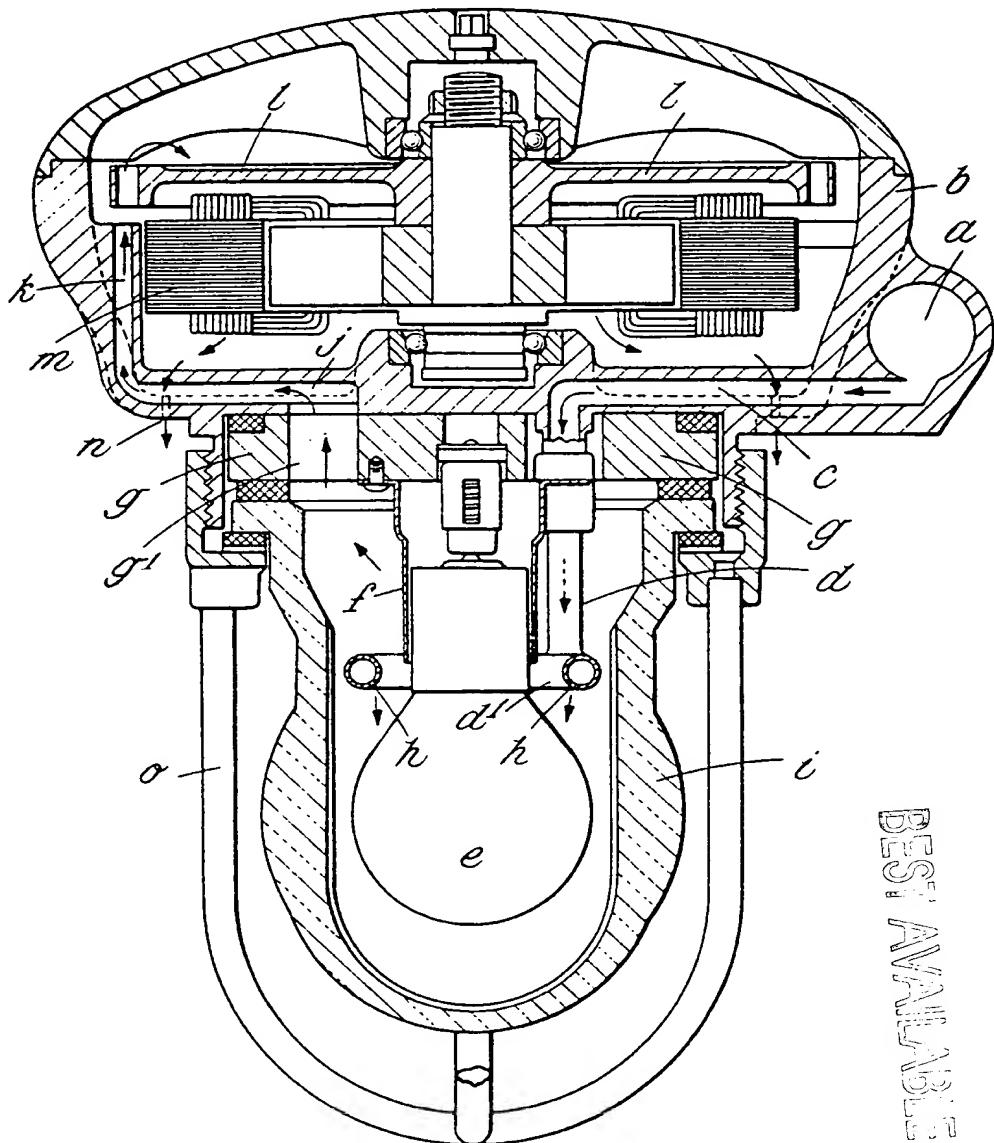
Dated the 22nd day of January, 1937.

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*[This Drawing is a reproduction of the Original on a reduced scale.]*



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